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CHIEF OF ENGINEERS
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WASHINGTON, D.C. 20310-2600

DAEN

APR 26 2016

SUBJECT: American River Common Features General Reevaluation Report, California

THE SECRETARY OF THE ARMY

1. I submit, for transmission to Congress, my report on the study of flood risk management along the American and Sacramento Rivers within the metropolitan area of Sacramento, California. It is accompanied by the report of the Sacramento District Engineer and the South Pacific Division Engineer. These reports supplement the 29 June 1992, 27 June 1996, and 30 December 2010 reports of the Chief of Engineers, and were prepared as an interim general reevaluation study of the American River Common Features Project. The present study was conducted specifically to determine if there is a federal interest in modifying the authorized project features for flood risk management in the project area. The American River Common Features Project was authorized by Section 101(a) (1) of the Water Resources Development Act (WRDA) of 1996 (Public Law 104-303), as modified by Section 366 of WRDA 1999 (Public Law 106-53), Section 129 of the Energy and Water Development Appropriations Act, 2004 (Public Law 108-137), and Section 130 of the Energy and Water Development and Related Agencies Appropriations Act, 2008 (Division C of Public Law 110-161); and by Section 7002(2) of the Water Resources Reform and Development Act of 2014 (Public Law 113-121). Preconstruction engineering and design activities for this project will be continued under these authorities.

2. The reporting officers recommend authorizing a plan to reduce flood risk along the American and Sacramento Rivers and Eastside Tributaries in the Sacramento area. The recommendation is supported by the non-federal sponsors, the state of California and the Sacramento Area Flood Control Agency (SAFCA). The principal features of the recommended plan by reach are:

- Sacramento River East Levee
 - 9 miles of slurry cutoff walls to address levee seepage and stability problems
 - 10 miles rock bank protection to address erosion problems
 - 2.5 miles of geotextile stabilized slope and 2 miles of slope flattening to address levee stability
 - 1 mile of levee raise
- American River
 - 4 miles of rock bank protection and launchable rock trenches on the right bank to address erosion
 - 7 miles of rock bank protection and launchable rock trenches on the left bank to address erosion

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- Eastside Tributaries
 - 4 miles of slurry cutoff wall to address levee seepage and stability problems along the Natomas East Main Drain (NEMDC) and Arcade Creeks
 - 4 miles of levee raises to address potential floodwater overtopping along Arcade Creek.
 - About 1 mile of levee raise and extension along Magpie Creek along with 80 acres of floodplain preservation
- Sacramento Bypass
 - Widen the Sacramento Weir and Bypass by 1,500 feet to reduce the water surface elevation in the Sacramento River and allow more water to flow into the Bypass system. This would include the construction of a new 2 miles long setback levee.

3. The recommended Locally Preferred Plan (LPP) would reduce flood risk to the city of Sacramento and surrounding areas. The proposed project would reduce average annual damages within Sacramento by 73 percent, with residual average annual damages of approximately \$130 million. Annual exceedance probabilities for flooding within Sacramento would be reduced from approximately 3 percent (1 in 32 chance of flooding in any given year) to approximately 0.7 percent (1 in 147 chance of flooding in any given year). The proposed project would have significant long-term effects on environmental resources, however in all cases, the potential adverse environmental effects would be reduced to a less than significant level or mitigated through project design, construction practices, preconstruction surveys and analysis, regulatory requirements, habitat restoration, and best management practices. Approximately 0.4-acre of jurisdictional wetlands were identified in the project footprint which could be impacted by the project, however this impact would be mitigated through the purchase of credits at a mitigation bank. Potential impacts to vegetation communities and special status species have been greatly reduced through feasibility level design. Direct impacts to nesting birds, such as the Swainson's hawk and the Western yellow-billed cuckoo, and other sensitive species, such as the giant garter snake and the valley elderberry longhorn beetle, would be avoided by implementing preconstruction surveys and scheduling of construction activities. The U.S. Fish & Wildlife Service and National Marine Fisheries Service have provided Biological Opinions in which the agencies provided recommendations for design refinement or mitigation.

4. Based on October 2015 price-levels, the estimated total first cost of the plan is \$1,565,750,000. In accordance with the cost sharing provision of Section 103 of WRDA 1986, as amended (33 U.S.C. 2213), the state of California as the non-federal cost-sharing sponsor is responsible for the additional cost of the LPP. The federal share of the estimated first cost of initial construction would remain the same for the National Economic Development (NED) Plan and the LPP, currently estimated at \$876,478,000. The non-federal estimated cost share increases from \$467,514,000 with the NED Plan to \$689,272,000 with the LPP. The cost of lands, easements, rights-of-way, relocations, and dredged or excavated material disposal areas is estimated at \$254,299,000. The state of California, along with the city of Sacramento and the American River Flood Control District would be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project after construction. OMRR&R is currently estimated at \$494,000 per year.

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5. Based on a 3.125-percent discount rate and a 50-year period of analysis, the total average annual costs of the project are estimated to be \$74,777,000, including OMRR&R. The selected plan is estimated to be 89 percent reliable in safely passing a flood which has a one percent chance of occurrence in any year (1 percent annual chance of exceedance) significantly reducing flood risk for the City of Sacramento, California. The selected plan would also reduce average annual flood damages by about 73 percent and would leave average annual residual damages estimated at \$130 million. Average annual economic benefits are estimated to be \$344,695,000; net average annual benefits are \$269,918,000. The benefit-to-cost ratio (BRC) is 4.6 to 1. The NED Plan, although not being recommended, provides average annual benefits of \$344,298,000 with average annual costs of \$63,576,000; yielding net benefits of \$280,722,000 and a BCR of 5.4 to 1.

6. The goals and objectives included in the Campaign Plan of the U.S. Army Corps of Engineers have been fully integrated into the American River Common Features general reevaluation study process. The recommended plan has been designed to avoid or minimize environmental impacts while maximizing future safety and economic benefits to the community. The recommended plan allows for continued floodplain flooding in the widened Sacramento Bypass while focusing the flood risk reduction on the established urban area. The general reevaluation study team organized and participated in stakeholder meetings and public workshops throughout the process and worked with local groups to achieve a balance of project goals and public concerns. The study report fully describes flood risks associated with the American and Sacramento Rivers and describes the residual risk. The residual risks have been communicated to the state of California and the SAFCA and they understand and agree with the analysis.

7. In accordance with the Corps guidance on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and rigorous review process to ensure technical quality. This included District Quality Control (DQC), Agency Technical Review (ATR), an Independent External Peer Review (IEPR) (Type I), and a Corps Headquarters policy and legal review. All concerns of the DQC and ATR have been addressed and incorporated into the final report. An IEPR was completed by Battelle Memorial Institute in July 2015. A total of 17 comments were documented. The IEPR comments identified one significant concern in the area of hydraulic analysis which was addressed with clarifying language. Additional comments of medium to low significance focused on areas of the plan formulation, engineering assumptions, and environmental analyses that needed improvements to support the decision-making process and plan selection. This resulted in expanded narratives throughout the report to support the decision-making process and justify the recommended plan. All comments from the above referenced reviews have been addressed and incorporated into the final documents. Overall the reviews resulted in improvements to the technical quality of the report. A safety assurance review (Type II IEPR) will be conducted during the design phase of the project.

8. Washington level review indicated that the project recommended by the reporting officers is technically sound, environmentally and socially acceptable, and economically justified. The plan complies with all essential elements of the 1983 U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Land Related Resources Implementation

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Studies. The recommended plan complies with other administrative and legislative policies and guidelines. The views of interested parties, including federal, state and local agencies have been considered.

9. I concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend modifying the authorized American River Common Features project to include the following: the construction of levee improvement measures to address seepage, stability, erosion and overtopping concerns identified for the Sacramento River, Natomas East Main Drainage Canal (NEMDC), Arcade Creek, and Magpie Creek as well as erosion measures for specific locations along the American River. The Sacramento Weir and Bypass would be widened to divert more flood flows into the Yolo Bypass. Further, I advise that these be authorized in accordance with the reporting officers' recommended plan at an estimated cost of \$1,565,750,000 with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing, financing, and other applicable requirements of federal and state laws and policies. The NED Plan cost component of the LPP recommended in this report will be cost shared in accordance with Section 103 of WRDA 1986, as amended (33 U.S.C. 2213), with a minimum non-federal share of 35 percent, not to exceed 50 percent, of total NED Plan costs. The non-federal share will also include 100 percent of the LPP increment above the NED Plan costs. Applying these requirements, the federal portion of the estimated total first cost is \$876,478,000 and the non-federal portion is \$689,272,000, or a federal share of 56 percent and a non-federal share of 44 percent. Federal implementation of the LPP would be subject to the non-federal sponsor agreeing to comply with applicable federal laws and policies, including but not limited to:

a. Provide the non-federal share of total project costs, including a minimum of 35 percent, but not to exceed 50 percent, of the total costs of the NED Plan, and 100 percent of the costs of the LPP increment, as further specified below:

1. Provide 35 percent of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

2. Provide, during construction, a contribution of funds equal to 5 percent of total project costs;

3. Provide all lands, easements, and rights-of-way, perform or ensure the performance of any relocation determined by the Federal Government to be necessary for the construction, operation, and maintenance of the project, and provide relocation assistance, all in compliance with applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601-4655), and the regulations contained in 49 C.F.R. Part 24;

4. Provide, during construction, any additional funds necessary to make its total contribution equal to at least 35 percent of the total costs of the NED Plan;

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5. Provide 100 percent of the costs of the LPP increment above the total costs of the NED Plan;

b. Inform affected interests, at least annually, of the extent of protection afforded by the project; participate in and comply with applicable federal floodplain management and flood insurance programs; comply with Section 402 of WRDA of 1986, as amended (33 U.S.C. 701b-12); and publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulation, or taking other actions, to prevent unwise future development and to ensure compatibility with protection levels provided by the project;

c. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the level of protection the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;

d. For so long as the project remains authorized, operate, maintain, repair, rehabilitate, and replace the project, or functional portions of the project, including any mitigation features, at no cost to the Federal Government, in a manner compatible with the project's authorized purposes and in accordance with applicable federal and state laws and regulations and any specific directions prescribed by the Federal Government;

e. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, rehabilitation, and replacement of the project and any betterments, except for damages due to the fault or negligence of the United States or its contractors;

f. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for construction, operation, and maintenance of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction;

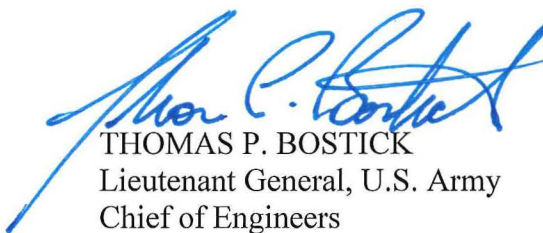
g. Assume, as between the Federal Government and the non-federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for construction, operation, and maintenance of the project;

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h. Agree, as between the Federal Government and the non-federal sponsor, that the non-federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, repair, rehabilitate, and replace the project in a manner that will not cause liability to arise under CERCLA; and

10. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsor, the states, interested federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.



THOMAS P. BOSTICK
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Chief of Engineers